

Unusual complication of radial artery cannulation

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Currently, radial artery cannulation is the preferred method for continuous hemodynamic monitoring in critically ill patients. Reported complications of radial artery cannulation include infection, digital gangrene, thrombosis, pseudoaneurysm, skin necrosis and median nerve palsy. Radial artery catheter fracture is a very rare complication. A review of the English language literature revealed only one reported case.

We present an additional case of spontaneous radial artery catheter fracture.

Key Words: *Catheter complications; Catheter fracture; Radial artery cannulation*

Complication rare de la canulation artérielle radiale

La canulation artérielle radiale est à l'heure actuelle le meilleur moyen de surveillance continue de l'hémodynamie chez les patients gravement atteints. Parmi les complications signalées, mentionnons les infections, la gangrène des doigts, les thromboses, les pseudo-anévrismes, la nécrose de la peau et la paralysie du nerf médian. Toutefois, la cassure du cathéter artériel radial s'avère une complication très rare. Un examen de la documentation en anglais a permis de relever un seul cas déclaré. Il sera question ici d'un autre cas de cassure spontanée du cathéter artériel.

Currently, radial artery cannulation is the preferred method for continuous hemodynamic monitoring in critically ill patients (1,2). Reported complications of radial artery cannulation include infection (1), digital gangrene (3), thrombosis (4), pseudoaneurysm (5), skin necrosis (6) and median nerve palsy (7). Radial artery catheter fracture is a very rare complication. A review of the English language literature revealed only one reported case (8).

We present an additional case of spontaneous radial artery catheter fracture.

CASE PRESENTATION

A 58-year-old man was admitted to the hospital with a diagnosis of acute recurrent pancreatitis. He continued to have difficulties and was later found to have an infected pseudocyst, which was drained under computed tomography control. He developed pneumonia, had elevated liver enzymes and was

admitted to the intensive care unit, where he was intubated and ventilated. One day postadmission, the right radial artery was cannulated percutaneously with 1.25 inch, 20-gauge Teflon catheter (CATHLON IV Catheter, Johnson & Johnson, USA), which was then sutured in place with a single suture around the hub. The catheter remained in place for 15 days. By day 16 the patient's condition improved and arterial pressure monitoring was no longer required, and the catheter was removed. Once the suture holding the catheter in place was divided, the catheter dislodged spontaneously. There was excessive bleeding from the entry site, and pressure was applied. Examination of the catheter revealed that approximately one-third of its length was missing. Clinical examination of the hand revealed normal colour, capillary refill, and easily palpable radial and ulnar pulses.

A plain x-ray performed immediately showed a tubular foreign body of lower density projected over the soft tissues along

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Figure 1) X-ray of the right forearm and hand showing the separated distal end of the catheter in the soft tissue of the wrist

the radial aspect of scaphoid (Figure 1). These findings were confirmed by ultrasound (Figure 2). The position of the catheter was marked on the skin.

A few hours later, the patient was taken to the operating room. On exploration via direct arteriotomy, the catheter was not found at the marked site. An intraoperative ultrasound was obtained. The catheter tip was found near the puncture site inside the radial artery. It was then removed through another arteriotomy incision guided by ultrasound. The arteriotomy was then closed using microscopic technique. At the end of the surgery, there was excellent flow through the radial artery with good capillary refill in all fingers.

The retrieved broken piece of catheter and the proximal hub were then sent to the manufacturer for analysis. The manufacturer (Johnson & Johnson) stated that they could



Figure 2) Ultrasound of the right forearm showing a 14 mm long segment of the catheter in the lumen of the radial artery

find no mechanical or structural reason for the breakage of the catheter.

DISCUSSION

Catheter fracture is an uncommon yet potentially serious complication of arterial catheters.

Long cannulation time is associated with flow obstruction and catheter malfunction, which mandates repeated flushing and manipulative adjustment of the catheter (9,10). Although the reasons for the occurrence of this very rare complication are uncertain, we feel that the repeated flushing and manipulative adjustments associated with prolonged cannulation time created a weak point in the catheter, at which it fractured when the supporting suture was divided.

In this case, in addition to plain x-ray, we used ultrasound both pre- and intraoperatively. We have found that ultrasound is an excellent adjunct to x-ray in confirming the site and precisely determining the length of the fractured tip. Its use intraoperatively enabled us to determine precisely and quickly the site of our arteriotomy, saving time and avoiding repeated incorrect arteriotomies.

To prevent radial artery catheter fracture, we recommend gentle handling of the catheter before insertion to avoid traumatic damage, removal of the catheter when malfunction occurs or it is no longer needed, detailed documentation of the insertion and removal techniques and events during monitoring, inspection of the catheter tip upon removal and routine dorsal wrist splint to avoid kinking of the catheter. The use of ultrasound, particularly intraoperatively, for the real time location is invaluable.

Although radial artery cannulation is a safe and generally low-risk technique (11), vigilance is required to prevent complications requiring additional intervention.

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